

# Analysis A

② 1.1 Nullst. keine  $\checkmark$   $x=0 \Rightarrow y=1 \cdot e^1 = e \checkmark$

1.2  $x \rightarrow -\infty \Rightarrow \underbrace{(1+x^2)}_{+\infty} \underbrace{e^{1-0,5x}}_{+\infty} \rightarrow \infty \checkmark$

④  $x \rightarrow +\infty \Rightarrow \underbrace{(1+x^2)}_{+\infty} \underbrace{e^{1-0,5x}}_{0^+} \rightarrow 0^+ \checkmark$

1.3  $f'(x) = 2x e^{1-0,5x} + (1+x^2) e^{1-0,5x} \cdot (-0,5) \checkmark \checkmark$   
 $= (-0,5x^2 + 2x - 0,5) e^{1-0,5x} \stackrel{!}{=} 0 \checkmark$

$$-0,5x^2 + 2x - 0,5 = 0 \Rightarrow x_{1,2} = \frac{-2 \pm \sqrt{4 - 4(-0,5)(-0,5)}}{-1} \checkmark = 2 \pm \sqrt{3}$$

$x_1 \approx 0,27 \checkmark \quad y_1 \approx 2,55 \checkmark$

$x_2 \approx \mathbf{3,73} \checkmark \quad y_2 \approx 6,28 \checkmark$

|           |            |                   |            |
|-----------|------------|-------------------|------------|
| Monotonie | $x < 0,27$ | $0,27 < x < 3,73$ | $x > 3,73$ |
| $f'(x)$   | -          | +                 | -          |
| Graph     | fällt      | steigt            | fällt      |

VVV

⑩

oder  $f''(x) = (-x+2) e^{1-0,5x} + (-0,5x^2 + 2x - 0,5) e^{1-0,5x} \cdot (-0,5)$   
 $= (0,25x^2 - 2x + 2,25) e^{1-0,5x}$

$f''(2-\sqrt{3}) > 0 \Rightarrow \text{TIP}$

$f''(2+\sqrt{3}) < 0 \Rightarrow \text{HOP}$

⑤ Zeichnung

② 2.1  $t=13 \checkmark \Rightarrow f(13) = \frac{24000}{1+e^{-0,325(13-12)}} \approx 13933 \checkmark \checkmark$

2.2  $y = 24000 \cdot 0,95 = 22800 \checkmark$

$22800 = \frac{24000}{1+e^{-0,325(t-12)}} \checkmark$

$1+e^{-0,325(t-12)} = \frac{24000}{22800} \checkmark$

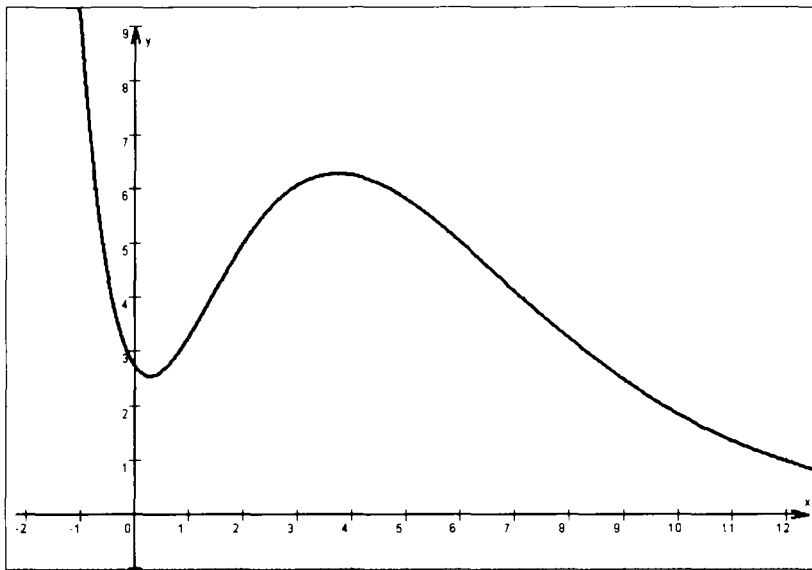
④  $e^{-0,325(t-12)} = \frac{1}{19} \quad | \ln \checkmark$

$-0,325(t-12) \approx -2,944 \checkmark$

$t-12 \approx 9,05 \Rightarrow t \approx 21$

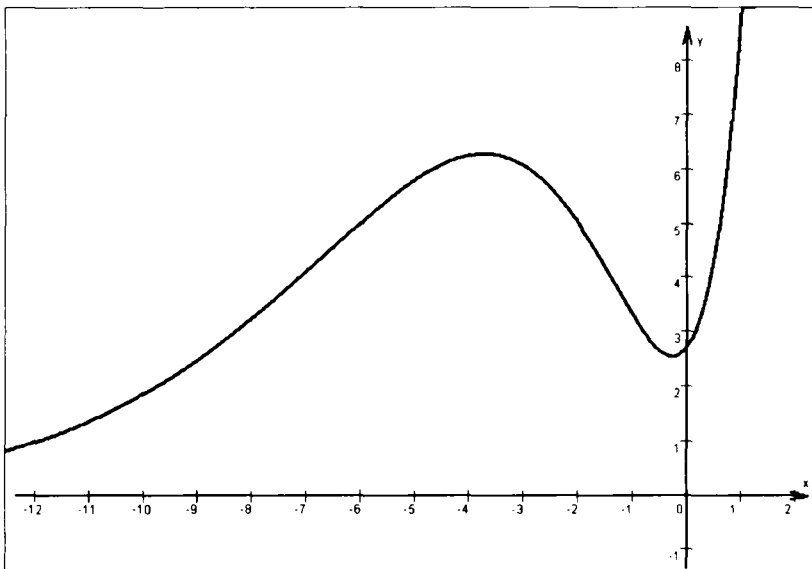
(also 2021)  $\checkmark$

A



$$f(x) = (1+x^2)e^{1-0.5x}$$

B



$$f(x) = (1+x^2)e^{1+0.5x}$$